

REMARKS

The 17 April 2003 official action addressed claims 1-10. Claims 1-10 are amended and remain pending.

Drawings

Formal drawings for Figures 6-7 and 9-15 are submitted herewith. These figures are now labeled as "Prior Art."

Claim amendments

Independent claims 1, 4 and 8 are amended to recite an element isolation film that is located in the substrate between a dopant diffusion region and a source diffusion layer. An example of this feature is shown in Figure 2, in which an element isolation film 10 is provided between dopant diffusion region 4a and source diffusion layer 3c.

Independent claims 1, 4 and 8 are further amended to specify that a first conductive type well having a lowered dopant concentration at least partially underlies the element isolation film. An example of this feature is shown in Figure 2, in which well 1a partially underlies element isolation film 10.

Claims 3 and 7 and independent claim 8 are amended to specify that a source diffusion layer is connected to a reference potential to which a dopant diffusion region is connected. An example of this feature is shown in Figure 2, in which dopant diffusion region 4a and source diffusion layer 3c are both connected to ground.

Claims 2 is amended to specify that source and drain diffusion layers are disposed over a second conductive type well. Claims 5 is amended to specify that source and drain diffusion layers and a dopant diffusion region are disposed over a second conductive type well. An example of this structure is shown in Figure 2, in which source and drain diffusion layers 3c, 3b and dopant diffusion region 4a are disposed over well 2.

No new matter is added.

Prior art rejection

Claims 1-10 were rejected under 35 USC §103(a) as being obvious over the admitted prior art (APA) in view of Morihisa (JP 10-173,070). It is believed that the amended claims are patentably distinguished from the cited references for the reasons discussed below.

The claimed invention pertains to an I/O protection circuit that uses field effect transistors (FETs). The protection circuit of the claimed invention (e.g. Figure 2) uses an element isolation film (10) located in the substrate between a source diffusion (3c) and a dopant diffusion (4a) to separate the source diffusion from the dopant diffusion, and uses a well (1a) beneath a source diffusion that has a lower dopant concentration than the source diffusion and that partially underlies the element isolation film.

The official action (page 5) refers to element 30 of Morihisa as an element isolation film. However, it is believed that Morihisa's element 30 is actually a conductive silicide (i.e. metal/silicon alloy) portion of a gate electrode, as it is set atop a MOSFET gate in the conductive path of the gate. Moreover, the machine translation of Morihisa available from the Japanese Patent Office web site identifies element 30 as a "silicide layer" (see paragraph 9).

Each of independent claims 1, 4 and 8 requires:

...an element isolation film located in the substrate between the dopant diffusion region of the second conductive type and the source diffusion layer of the first conductive type, for separating the dopant diffusion region from the source diffusion layer... (claim 1)

Morihisa's element 30 is not an element isolation film, it is not located in the substrate, and it does not separate the dopant diffusion region (15) from the source diffusion layer (16). Further, Morihisa appears to contain no structure that has these specified features. Therefore the claimed invention is distinguished on this basis.

Each of independent claims 1, 4 and 8 further requires that a well having a lowered dopant concentration partially underlies the element isolation film. The official action has previously asserted that a well having a lowered dopant


concentration is taught by Morihisa, however the present claims specify a well having a particular structural relation to an element isolation film in the substrate. The element isolation film is not taught by the cited references and so the use of a well in the claimed manner is likewise not taught. Therefore the claimed invention is also distinguished on this basis.

Accordingly, each of independent claims 1, 4 and 8 is distinguished from the cited references for the reasons explained above. The remaining claims are dependent from these claims and are therefore distinguished for the same reasons as well as for the additional novel features that they recite.

The foregoing amendments and remarks address all bases for objection and rejection and are believed to place the case in condition for allowance. The examiner is invited to contact the undersigned to resolve any remaining issues.

Respectfully submitted,

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